

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-36. (Cancelled)

37. (Currently Amended) A Method—method for wireless communication in a multi-user, multi-carrier communications system, using a multi-carrier resource space of at least two dimensions, of which one is frequency, said multi-carrier communications system allowing a data stream to be separated into a series of parallel data streams, each of which is modulated and simultaneously transmitted with a different frequency, comprising the steps of:

- allocating a first resource sub-space of ~~entire~~—said multi-carrier resource space for communication between a first node and a second node;
- said first resource sub-space comprising resources of more than one carrier;
- obtaining data associated with estimated radio conditions for communication between the first node and the second node;
- allocating a second resource sub-space of ~~entire~~—said multi-carrier resource space for communication between the first node and a third node;
- said second resource sub-space comprising resources of more than one carrier;
- obtaining data associated with estimated radio conditions for communication between the first node and the third node; and
- providing access to the use of at least two pilot resource configurations, intended for different estimated node radio conditions,

 whereby the first resource sub-space is associated a pilot resource configuration, suitable being in agreement with pilot need for the estimated radio conditions for the second node and the second resource sub-space is associated a pilot resource configuration, suitable being in agreement with pilot need for the estimated

radio conditions for the third node; and

whereby at least one of the first resource sub-space and the second resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space or said second resource subspace, respectively.

38. (Currently Amended) ~~The method~~ according to claim 37, wherein the entire multi-carrier resource space ~~being~~ is divided into parts having different pilot resource configurations;

whereby the steps of allocating acts comprises comprise the stepsacts of selecting the first resource sub-space and the second resource sub-space in respective parts having a pilot resource configuration suitable for the estimated radio conditions for the second node and the third node, respectively.

39. (Currently Amended) ~~Method~~The method according to claim 38, further comprising
~~the further steps of:~~

- selecting an arbitrary first multi-carrier resource sub-space; if no resource space part having a pilot resource configuration suitable for the estimated radio conditions for the second node or the third node, respectively, is available, an arbitrary first multi-carrier resource sub-space; and

- adapting the pilot resource configuration within the first multi-carrier resource sub-space to suit the estimated radio conditions for the second node or the third node, respectively.

40. (Currently Amended) ~~Method~~The method according to claim 37, further comprising the steps of:

- selecting the first multi-carrier resource sub-space;
- selecting the second multi-carrier resource sub-space; and thereafter
- adapting the pilot resource configuration within the first and second multi-carrier resource sub-space to suit the estimated radio conditions for the second node and the third node, respectively, ~~after the step of selecting~~.

41. (Currently Amended) ~~Method~~The method according to claim 37, wherein the multi-carrier resource space has a time dimension.

42. (Currently Amended) ~~Method~~The method according to claim 37, wherein the multi-carrier resource space has a code dimension.

43. (Currently Amended) ~~Method~~The method according to claim 37, wherein the multi-carrier resource space has a spatial dimension.

44. (Currently Amended) ~~Method~~The method according to claim 37, wherein the steps of obtaining acts in turn comprises the steps of estimating a set of estimated radio conditions.

45. (Currently Amended) ~~Method~~The method according to claim 44, wherein the set of estimated radio conditions comprises at least one of Doppler conditions and coherence time conditions.

46. (Currently Amended) ~~Method~~The method according to claim 44, wherein the set of estimated radio conditions comprises at least one of delay spread conditions and coherence bandwidth conditions.

47. (Currently Amended) ~~Method~~The method according to claim 44, wherein the steps of estimating acts are based on position and/or velocity information concerning the second node and the third node, respectively.

48. (Currently Amended) ~~Method~~The method according to claim 37, wherein the steps of obtaining acts comprises the steps of receiving instructions and/or suggestions about preferred pilot resource configuration.

49. (Currently Amended) ~~Method~~The method according to claim 37, wherein the first node is selected from the group of:

- user equipment;
- mobile station;
- base station;
- access point; and
- relay.

50. (Currently Amended) ~~Method~~The method according to claim 37, wherein at least one of the second node and the third node is selected from the group of:

- user equipment;
- mobile station;
- base station;
- access point; and
- relay.

51. (Currently Amended) ~~Method~~The method according to claim 37, wherein resources of the first and second resource sub-spaces are allocated for downlink communication.

52. (Currently Amended) ~~Method~~The method according to claim 51, wherein the ~~steps~~acts of obtaining data associated with estimated radio conditions for the second node and the third node is performed in a base station or access point.

53. (Currently Amended) ~~Method~~The method according to claim 52, further comprising the ~~steps~~ of transferring data characterizing the first pilot resource configuration from the base station or access point to the second node and transferring data characterizing the second pilot resource configuration from the base station or access point to the third node.

54. (Currently Amended) ~~Method~~The method according to claim 37, wherein resources of the first resource sub-space and the second resource sub-space are allocated for uplink communication.

55. (Currently Amended) ~~Method~~The method according to claim 54, wherein the ~~steps~~acts of obtaining data associated with estimated radio conditions for the second node and for the third node are performed in a base station or access point, followed by the ~~steps~~acts of transferring the data associated with estimated radio conditions for the second node to the second node and transferring the data associated with estimated radio conditions for the third node to the third node.

56. (Currently Amended) ~~Method~~The method according to claim 54, wherein the ~~step~~act of obtaining data associated with estimated radio conditions for the second node is performed in the second node and the ~~step~~act of obtaining data associated with estimated radio conditions for the third node is performed in the third node.

57. (Currently Amended) ~~Method~~The method according to claim 56, further comprising the steps of transferring data characterizing the first pilot resource configuration from the second node to the first node and transferring data characterizing the second pilot resource configuration from the third node to the first node.
58. (Currently Amended) ~~Method~~The method according to claim 37, further comprising the step of refraining from transmitting pilots in areas of the entire multi-carrier resource space not being allocated.
59. (Currently Amended) ~~Method~~The method according to claim 37, wherein the wireless communication utilises OFDM.
60. (Currently Amended) ~~Method~~The method according to claim 37, wherein the available at least two pilot resource configurations comprises different distribution patterns of pilot symbols in the multi-carrier resource space.
61. (Currently Amended) ~~Method~~The method according to claim 60, wherein the available at least two pilot resource configurations further comprises transmission of pilot symbols with differing intensity.

62. (Currently Amended) A first node of a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of least two dimensions, of which one is frequency, said first node being arranged for handling a data stream separated into a series of parallel data streams, each of which being modulated and simultaneously transmitted with a different frequency, the first node comprising:

- means for allocating a first resource sub-space of entire-said multicarrier resource space for communication between the first node and a second node; said first resource sub-space comprising resources of more than one carrier;
- means for obtaining data associated with estimated radio conditions for communication between the first node and the second node;
- means for allocating a second resource sub-space of entire-said multi-carrier resource space for communication between the first node and a third node; said second resource sub-space comprising resources of more than one carrier;
- means for obtaining data associated with estimated radio conditions for communication between the first node and the third node; and
- means for providing access to the use of at least two pilot resource configurations, intended for different estimated node radio conditions, whereby the first resource sub-space comprises a pilot resource configuration; ~~being in agreement with pilot need~~ suitable for the estimated radio conditions for the second node and the second resource sub-space comprises a pilot resource configuration; ~~being in agreement with pilot need~~ suitable for the estimated radio conditions for the third node, and whereby at least one of the first resource sub-space and the second resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space or said second resource subspace, respectively.

63. (Currently Amended) NodeThe node according to claim 62, wherein the entire multi-carrier resource space being divided into parts having different pilot resource configurations;

whereby the means for allocating being arranged for selecting the first resource sub-space in a part having a pilot resource configuration suitable for the estimated radio conditions for the second node and for selecting the second resource sub-space in a part having a pilot resource configuration suitable for the estimated radio conditions for the third node.

64. (Currently Amended) NodeThe node according to claim 62, further comprising:

means for selecting the first multi-carrier resource sub-space;

means for selecting the second multi-carrier resource sub-space; and

means for adapting the pilot resource configuration within the first multi-carrier resource sub-space to suit the estimated radio conditions for the second node and for adapting the pilot resource configuration within the second multi-carrier resource sub-space to suit the estimated radio conditions for the third node, the means for adapting being connected to an output of the means for selecting.

65. (Currently Amended) NodeThe node according to claim 62, further comprising:

means for transferring data characterizing the first pilot resource configuration from the first node to the second node and for transferring data characterizing the second pilot resource configuration from the first node to the third node.

66. (Currently Amended) NodeThe node according to claim 62, wherein the means for obtaining data associated with estimated radio conditions for the second node in turn comprise a receiver for receiving instructions and/or suggestions about preferred pilot resource configuration from the second node and the third node.

67. (Currently Amended) NodeThe node according to claim 62, being arranged for OFDM.

68. (Currently Amended) NodeThe node according to claim 62, being a node selected from the group of:

- user equipment;
- mobile station;
- base station;
- access point; and
- relay.

69. (Currently Amended) NodeThe node according to claim 62, wherein the second node is selected from the group of:

- user equipment; mobile station; base station;
- access point; and relay.

70. (Currently Amended) A Wireless-wireless communications system, being a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of least two dimensions, of which one is frequency, said wireless communications system being arranged for handling a data stream separated into a series of parallel data streams, each of which being modulated and simultaneously transmitted with a different frequency, comprising at least one node, said at least one node in turn comprising:

- means for allocating a first resource sub-space of ~~entire~~ said multi-carrier resource space for communication between the first node and a second node;

 said first resource sub-space comprising resources of more than one carrier;

- means for obtaining data associated with estimated radio conditions for communication between the first node and the second node;

- means for allocating a second resource sub-space of ~~entire~~ said multi-carrier resource space for communication between the first node and a third node;

 said second resource sub-space comprising resources of more than one carrier;

- means for obtaining data associated with estimated radio conditions for communication between the first node and the third node; and

- means for providing access to the use of at least two pilot resource configurations, intended for different estimated node radio conditions,

 whereby the first resource sub-space comprises a pilot resource configuration, ~~being in agreement with pilot need~~ suitable for the estimated radio conditions for the second node and the second resource sub-space comprises a pilot resource configuration, ~~being in agreement with pilot need~~ suitable for the estimated radio conditions for the third node, and

 whereby at least one of the first resource sub-space and the second resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space or said second resource sub-space, respectively.

71. (Currently Amended) A User-user equipment being arranged to handle connection to a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of least two dimensions, of which one is frequency, said user equipment being further arranged for handling a data stream to be separated into a series of parallel data streams, each of which is modulated and simultaneously transmitted with a different frequency, the user equipment comprising:

- means for communication between the user equipment and a node utilizing a first resource sub-space of entire said multi-carrier resource space;
- said first resource sub-space comprising resources of more than one carrier;
- said first resource sub-space comprising a first pilot resource configuration, out of a set of at least two different pilot resource configurations;
- whereby the first pilot resource configuration is suitable being in agreement with pilot need for estimated radio conditions for the user equipment; and
- whereby the first resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space.

72. (Currently Amended) User~~The user~~ equipment according to claim 71, further comprising:

- receiver for receiving data characterizing the first pilot resource configuration from the node;
- means for channel estimation, connected to the receiver,
- whereby the means for channel estimation is arranged to perform channel estimation based on the received data characterizing the first pilot resource configuration.

73. (New) A first node of a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of least two dimensions, of which one is frequency, said first node being arranged for handling a data stream separated into a series of parallel data streams, each of which being modulated and simultaneously transmitted with a different frequency, the first node comprising:

a control unit configured to allocate a first resource sub-space of said multi-carrier resource space for communication between the first node and a second node and to allocate a second resource sub-space of said multi-carrier resource space for communication between the first node and a third node, said first resource sub-space comprising resources of more than one carrier and said second resource sub-space comprising resources of more than one carrier;

means for obtaining data associated with estimated radio conditions for communication between the first node and the second node and for obtaining data associated with estimated radio conditions for communication between the first node and the third node; and

a pilot manager configured to provide access to the use of at least two pilot resource configurations, intended for different estimated node radio conditions, whereby the first resource sub-space comprises a pilot resource configuration suitable for the estimated radio conditions for the second node and the second resource sub-space comprises a pilot resource configuration suitable for the estimated radio conditions for the third node, and whereby at least one of the first resource sub-space and the second resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space or said second resource subspace, respectively.

74. (new) The node according to claim 73, wherein the multi-carrier resource space being divided into parts having different pilot resource configurations, wherein the control unit is configured to select the first resource sub-space in a part having a pilot resource configuration suitable for the estimated radio conditions for the second node and to select the second resource sub-space in a part having a pilot resource configuration suitable for the estimated radio conditions for the third node.

75. (New) The node according to claim 73, being a node selected from the group of:

- user equipment;
- mobile station;
- base station;
- access point; and
- relay.

76. (New) The node according to claim 73, wherein the second node is selected from the group of: user equipment; mobile station; base station; access point; and relay.

77. (New) A wireless communications system, being a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of least two dimensions, of which one is frequency, said wireless communications system being arranged for handling a data stream separated into a series of parallel data streams, each of which being modulated and simultaneously transmitted with a different frequency, comprising at least one node, said at least one node in turn comprising:

a control unit configured to allocate a first resource sub-space of said multi-carrier resource space for communication between the first node and a second node and to allocate a second resource sub-space of said multi-carrier resource space for communication between the first node and a third node, said first resource sub-space comprising resources of more than one carrier and said second resource sub-space comprising resources of more than one carrier;

means for obtaining data associated with estimated radio conditions for communication between the first node and the second node and for obtaining data associated with estimated radio conditions for communication between the first node and the third node; and

a pilot manager configured to provide access to the use of at least two pilot resource configurations intended for different estimated node radio conditions, whereby the first resource sub-space comprises a pilot resource configuration suitable for the estimated radio conditions for the second node and the second resource sub-space comprises a pilot resource configuration suitable for the estimated radio conditions for the third node, and whereby at least one of the first resource sub-space and the second resource sub-space comprises a carrier having both pilot resources and data resources within said first resource sub-space or said second resource sub-space, respectively.

78. (New) A user equipment arranged to handle connection to a multi-user, multi-carrier wireless communications system using a multi-carrier resource space of at least two dimensions, of which one is frequency, said user equipment being further arranged for handling a data stream to be separated into a series of parallel data streams, each of which is modulated and simultaneously transmitted with a different frequency, the user equipment comprising:

means for communication between the user equipment and a node utilizing a first resource sub-space of said multi-carrier resource space;

a radio conditions processor configured to estimate radio conditions between the user equipment and the node and to select an appropriate pilot resource configuration out of a set of at least two different pilot resource configurations, each of the at least two different pilot resource configurations utilizing different sub-spaces of said multi-carrier resource space, each of said sub-spaces comprising resources of more than one carrier and comprising both pilot resources and data resources.